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10/787,407	02/27/2004	Masahiko Katsumura	PC 3216.01 US	4536
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/787,407

Applicant(s)

KATSUMURA, MASAHIKO

Examiner

Anca Eoff

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 02/27/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Status

1. Claims 1-9 are pending in the application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 8 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 8 and 9 are dependent on claim 6 but they refer to and further limit the "plurality of thin films" that appears in claim 7.

Claim 8 should be: "The electron beam recording substrate according to claim 7, wherein that thin film in said plurality of thin films which is in contact with said resist film is made of a material containing at least one of elements with atomic number 73 to 79 by 50wt.% or greater and those other than said thin film contacting said resist film are made of a material containing at least one of elements with atomic numbers 21 to 36, 38 to 54, 56, 57, 72 and 80 to 83 by 50 wt.% or greater."

Claim 9 should be " The electron beam recording substrate according to claim 7, wherein that thin film in said plurality of thin films which is in contact with said resist film is made of a material containing at least one of elements with atomic numbers 21 to 36, 38 to 54, 56, 57, 72 and 80 to 83 by 50wt.% or greater and those other than said film

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contacting said resist film are made of a material containing at least one of elements with atomic numbers 73 to 79 by 50 wt.% or greater."

For the examination purposes, claims 8 and 9 were treated as being dependent on claim 7.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraph of 35 U.S.C. 102 that forms the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2 and 4-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Mancini et al. (US Pg-Pub 2002/0122995).

With regard to claims 1 and 4, Mancini et al. disclose a lithographic template comprising:

- a substrate (number 12 in fig.1 and par.0017);
- a patterning layer (number 20 in fig.3 and par.0019), equivalent to the surface layer of the instant application, and
- a photoresist layer (number 24 in fig.4 and par.0021), equivalent to the resist film of the instant application.

The patterning layer can be made of indium-tin-oxide (In has Z=49), tungsten W, tungsten silicide WSi, tungsten silicon nitride WSiN, tungsten alloys (W has Z= 74),

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tantalum Ta, tantalum silicide TaSi, tantalum silicon nitride TaSiN, tantalum alloys (Ta has $Z=73$), titanium Ti, titanium alloys (Ti has $Z=22$), molybdenum Mo, molybdenum alloys (Mo has $Z=42$), gold Au ($Z=79$), chromium Cr ($Z=24$) (par.0019).

Since the patterning layer is made of the same materials as the surface area layer of the instant application, it is the examiner's position that the patterning layer of Mancini et al. has the capability of suppressing enlargement of a scattering distribution diameter of electrons spread inside by irradiation of an electron beam from a resist film side (MPEP 2112).

With regard to claim 2, Mancini et al. disclose a lithographic template comprising:

- a substrate (12);
- an etch-stop layer (16);
- a patterning layer (20), equivalent to the surface layer area of the instant application, and
- a photoresist layer (4), equivalent to the resist film of the instant application, situated on top of the patterning layer (20) (fig.4 and par.0017-0021).

Mancini et al. also disclose that the etch stop layer is optional (abstract) and the substrate itself may perform sufficiently as an etch stop material (par.0019). In this case, the patterning layer is placed on top of the substrate.

With regard to claim 5, Mancini et al. further disclose that the patterning layer can be made of 100 wt.% tantalum Ta ($Z=73$), tungsten W ($Z=74$), gold Au ($Z=79$) (par.0019).

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With regard to claim 6, Mancini et al. further disclose that substrate can be a quartz material (par.0017), wherein quartz (SiO_2) contains 46.66 wt. % of Si ($Z=14$). The patterning layer can be made of tantalum Ta ($Z=73$), tungsten W ($Z=74$), gold Au ($Z=79$) (par.0019), wherein the patterning layer is made of 100 wt.% Ta, W or Au.

With regard to claims 7 and 8, Mancini et al. disclose a lithographic template comprising:

- a substrate (12);
- an etch-stop layer (16), that can be made of 100 wt.% chromium Cr ($Z=24$) (par.0018);
- a patterning layer (20), that can be made of 100 wt. % tantalum Ta ($Z=73$), tungsten W ($Z=74$), gold Au ($Z=79$) (par.0019);

The etch-stop layer (16) and the patterning layer (20) are equivalent to the plurality of thin films comprised in the surface area layer. The patterning layer (20) is equivalent to the thin film of the surface area layer in contact with the photoresist layer/resist film and the etch-stop layer (16) is equivalent to "those other than said thin film contacting the resist film" of the instant application.

- a photoresist layer (24)/resist film, situated on top of the patterning layer (20)

All the numbers above refer to fig.4.

With regard to claim 9, Mancini et al. further disclose that a hard-mask layer, made of 100 wt.% chromium Cr ($Z=24$), could be sandwiched between the patterning layer and the resist layer (par.0020). In this case, the chromium Cr hard-mask layer is in direct contact with the resist layer and the patterning layer that can be made of 100

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wt.% tantalum Ta (Z=73), tungsten W (Z=74) or gold Au (Z=79) is in contact with the substrate.

In this instance, the hard-mask layer and the patterning layer are equivalent to the plurality of thin films of the surface area layer, wherein the hard mask is equivalent to the thin film in contact with the photoresist layer/resist film and the patterning layer is equivalent to "those other than said thin film contacting the resist film" of the instant application.

6. Claims 1-2 and 4-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Myers (WO 98/58373).

With regard to claim 1, Myers discloses an optical disc comprising a substrate, a metallized layer and a coating formed from a radiation-curable composition (abstract).

The metallized layer is equivalent to the surface layer area of the instant application and it can be made of gold (Au, Z=79), copper Cu (Z=29), silver Ag (Z=47) (page 5, lines 17-19).

Since the metallized layer is made of the same materials as the surface area layer of the instant application, it is the examiner's position that the metallized layer of Myers has the capability of suppressing enlargement of a scattering distribution diameter of electrons spread inside by irradiation of an electron beam from a resist film side (MPEP 2112).

The coating formed from a radiation-curable composition is equivalent to the resist film of the instant application.

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With regard to claim 2, Myers further discloses that the metallized layer is formed on a surface of the substrate (page 5, line 14) and the radiation-curable composition is placed on the metallized layer (page 5, line 23).

With regard to claims 4-5, Myers further discloses that the metallized layer can be made of 100 wt.% gold (Au, Z=79) (page 5, lines 17-19).

7. Claims 1, 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Hwang (US Patent 5,773,366)

With regard to claims 1, 7 and 8, Hwang discloses:

- a substrate;
- a junction layer with a multilayer structure consisting of Ti/TiN films (Ti has Z=22), deposited over the substrate,
- a tungsten film (W has Z=74) deposited over the junction layer, and
- a photoresist film deposited over the tungsten film (column 3, lines 1-11).

The multilayer structure consisting of Ti/TiN films (Ti has Z=22) and the tungsten film (W has Z=74) are equivalent to the plurality of thin films comprised in the surface area layer of the instant application.

Since the multilayer structure consisting of Ti/TiN films (Ti has Z=22) and the tungsten film W (Z=74) are made of the same materials as the surface area layer of the instant application, it is the examiner's position that the multilayer structure consisting of Ti/TiN films and the tungsten film have the capability of suppressing enlargement of a

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scattering distribution diameter of electrons spread inside by irradiation of an electron beam from a resist film side (MPEP 2112).

The tungsten film is equivalent to the thin film in contact with the resist film and the junction layer with a multilayer structure consisting of Ti/TiN films is equivalent to "those other than said thin film contacting the resist film" of the instant application.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hotta (US Patent 5,521,034).

Hotta discloses a substrate having a photosensitive polyimide resin deposited thereon (column 4, lines 36-53), the photosensitive polyimide resin being equivalent to the resist film of the instant application.

The substrate can be made of Cu (Z=27), Ni (Z=28), Fe (Z=26) (column 2, lines 1-2).

Since the substrate is made of a material that lowers the scattered beam energy dispersion, it is the examiner's position that the upper surface of the substrate in the proximity of the photosensitive resin layer acts as a surface area layer.

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Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anca Eoff whose telephone number is 571-272-9810. The examiner can normally be reached on Monday-Friday, 6:30 AM-4:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AE *AE*

Barbara Gilliam
BARBARA GILLIAM
PRIMARY EXAMINER